

Characterizing PCB contamination in Painted Demolition Debris: The “Painted History” at the Iowa Army Ammunition Plant

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Why Characterize PCBs in Painted Demolition Waste?

Answer: EPA Reinterpreting TSCA?

- Reinterpretation: EPA Region 7, at Iowa Army Ammunition Plant (IAAAP), wants to regulate the **painting** of buildings with paint containing PCBs as if the PCBs were **spilled/released**
- New Interpretation Would: **Turn Demolition into Remediation**
- Interpretation Dispute Did (At IAAAP): Reduction in Demolition Scope and loss of **\$10 million** in potential Facility Reduction Program (FRP) Funding



Agenda

IAAAP

- 40 CFR 761.3 Definition PCB Bulk Product vs Remediation
- History PCBs in Paint
- FRP, PCB in Paint, and EPA History at IAAAP

ERDC

- IAAAP ERDC Sampling
- ERDC Summary of Data



40 CFR 761.3 Definition PCB Bulk Product Waste

PCB bulk product waste means waste derived from manufactured products containing PCBs in a non-liquid state, at any concentration where the concentration at the time of designation for disposal was ≥ 50 ppm PCBs. PCB bulk product waste does not include PCBs or PCB Items regulated for disposal under § 761.60(a) through (c), § 761.61, § 761.63, or § 761.64. PCB bulk product waste includes, but is not limited to:

- (1) Non-liquid bulk wastes or **debris from the demolition of buildings** and other man-made structures manufactured, coated, or serviced with PCBs. PCB bulk product waste **does not include** debris from the demolition of buildings or other man-made structures that is **contaminated by spills** from regulated PCBs which have not been disposed of, decontaminated, or otherwise cleaned up in accordance with subpart D of this part.



40 CFR 761.3 Definition PCB Remediation Waste

PCB remediation waste means waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations: Materials disposed of prior to April 18, 1978, that are currently at concentrations ≥ 50 ppm PCBs, regardless of the concentration of the original spill; materials which are currently at any volume or concentration where the original source was ≥ 500 ppm PCBs beginning on April 18, 1978, or ≥ 50 ppm PCBs beginning on July 2, 1979; and materials which are currently at any concentration if the PCBs are spilled or released from a source not authorized for use under this part. PCB remediation waste means soil, rags, and other debris generated as a result of any PCB spill cleanup, including, but not limited to: (1) soil, gravel, sediment (2) sewage sludge (3) Buildings and other man-made structures (such as concrete floors, wood floors, or walls contaminated from a leaking PCB or PCB-Contaminated Transformer), porous surfaces, and non-porous surfaces.



History of PCBs in Paint

- PCB's have been historically used as a plasticizer in building materials.
- Principally Aroclor 1254 was used in the past in paint when thermal and chemical resistance was desired. Paint and lacquer formulations specified up to 10% Aroclor 1254 yielding possible dry weights of up to 25% or 250,000 mg/kg.
- At IAAAP, a large caliber load assemble and pack facility built in the 1940's, PCBs in paint range from 0 – 24,000 mg/kg



History of FRP, PCBs in Paint and EPA at IAAAP

- 2005/6 - FRP Demolished Line 7. Burning of an explosive contaminated bay in Building 7-36, to eliminate the explosive hazard, was stopped by Region 7 EPA because of the unknown properties of the paint. Two paint samples were collected and analyzed for various parameters including PCBs. Total PCB results were 4,300 and 24,000 mg/kg, all of which were Aroclor-1254.

Note: EPA's position at this time was that all PCBs needed to be removed prior to burning or the Army conduct a risk based assessment. The performance based contractor removed the paint by mechanical methods. EPA then required a core sample be collected. One core sample was, result 0.8 mg/kg Total PCB.



History of FRP, PCBs in Paint and EPA at IAAAP

- **April 2008** – EPA disagrees with TSCA portion of demolition work plan. Plan states non metallic painted demolition debris will be managed as PCB Bulk Product Waste (i.e. no samples; waste disposed in a Municipal Solid Waste Landfill). EPA requests paint and substrate samples be collected from the “Paint Histories” of buildings slated for demolition.

EPA’s “Paint History”: Each paint color per building per building material/substrate.

- **July 2008** – Sample paint and substrate “Paint Histories” of 3 inactive non-explosive lines (33 Buildings, 102 Samples). Results 5 “Paint Histories” (5 samples ,4 buildings) contain substrate greater than 50 mg/kg PCB.

EPA Redefines/Reinterprets TSCA: Demolition waste painted with paint containing PCB’s is PCB Remediation Waste if the substrate contains 50 or greater mg/kg PCBs.



2008 Results (4 Buildings Substrate >50 ppm)

Building #	Paint Result (mg/kg or ppm)	Substrate Result (mg/kg or ppm)	Substrate Material	Paint Color
5A-21	795	210	plaster	Beige on Red on Green
5A-26	2670	76	concrete	Yellow
5B-137-2	1040	139	gypsum	Blue
5B-137-2	1100	52	chipboard	yellow
9-64	7960	218	concrete	Green



History of FRP, PCBs in Paint and EPA at IAAAP

- **Between July 2008 and 2009** – Letters, descoping, plan to mobilize, Iowa Department of Natural Resources (IDNR) states that all waste with paint or substrate results greater than 50 mg/kg PCB (21 Buildings, 46 Samples) can not be disposed of in Iowa. IDNR does agree that the waste is the painted wall, not the paint or the substrate, and recommends “**composite**” sampling (i.e. the painted wall).
- **July 2009** – Composite sample the non metallic “Paint Histories” with paint results greater than 50 mg/kg (38 Samples, 19 Buildings). Results indicate 12 “Paint Histories” (12 samples, 8 Buildings) contain levels greater than 50 mg/kg PCB.



2009 Results (8 Buildings Composite > 50 ppm)

Building #	Composite Sample Result for PCBs (mg/kg or ppm)	Substrate Material	2008 Paint Result	2008 Substrate Result
5A-25	408 N	Concrete	7770	18
5A-26	143	Concrete	2670	76
5A-55	195.4 J	Plaster	4290	ND
5B-21	68.2	Plaster	1930	ND
5B-55 (Red)	64.5 J	Plaster	2710	19
5B-55 (Green)	366 N	Plaster	2820	12
5B-137 (Blue)	194 N	Gypsum	1040	139
5B-137(Yellow)	198 N	Chipboard	1100	52
5B-137(Blue)	660 J	Chipboard	605	15
9-62	606 J	Concrete	117	ND
9-64 (green)	1365	Wood	3190	ND
9-64(Green o Red)	462.2 J	Concrete	7960	218



History of FRP, PCBs in Paint and EPA at IAAAP

- **Between July 2009 and April 2010** – more letters, scope reduction, demolish Line 9 and Line 5A buildings with both substrate and composite sample “Paint History” results less than 50 mg/kg PCB. Discover “core” samples not representative.
- **May 2010** – EPA Site Visit and ERDC resampling.

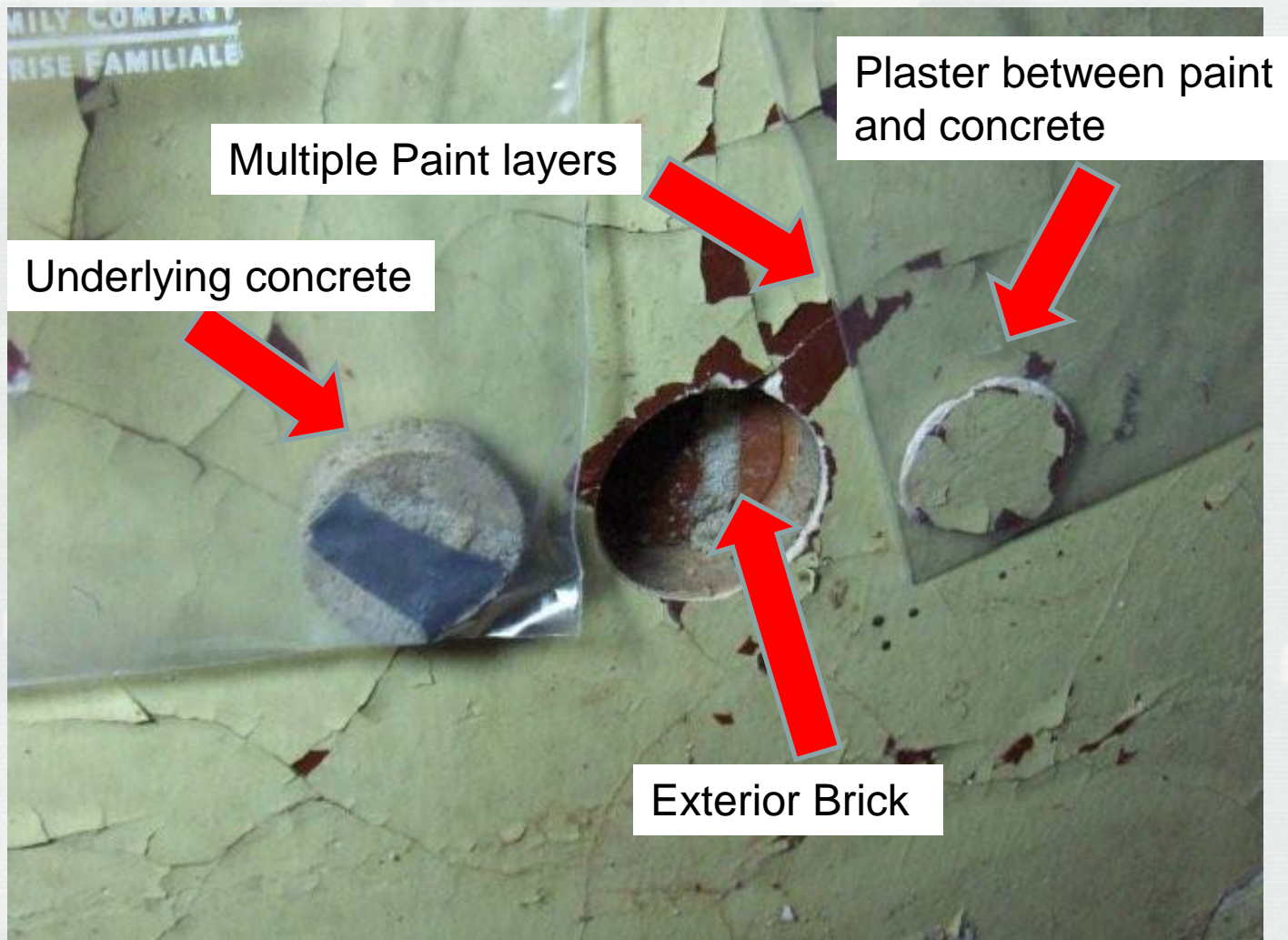


ERDC Site Investigation at IAAAP

- A case study at Iowa Army Ammunition Plant IAAAP was performed with the “Paint Histories” in which the walls of industrial concrete and porous building materials were sampled and analyzed for PCB contamination
- **November 2010** ERDC re-sampled the buildings using a coring machine, as opposed to previous sampling efforts that used hand tools. The 2008 and 2009 concrete samples were not representative of the waste stream.



ERDC Composite Defined:



PCB in Paint and Substrate

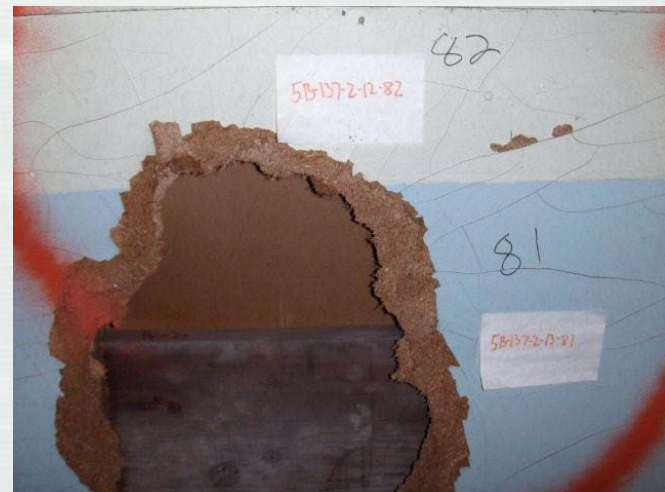


Some of these building materials were over 1 foot thick.



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Other Porous Media (wood, gypsum, chipboard)



2009 Composites Samples Not Representative



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Samples Not Representative

Problem(s):

- The 2008 and 2009 concrete samples were not representative of the waste stream.
- The 2009 composite sampling report states that 1 inch in diameter by $\frac{1}{2}$ to $\frac{3}{4}$ inch deep core samples were collected. However, some of these building materials were over 1 foot thick.
- A site visit was conducted to assess the 2008 sampling locations and it was discovered that the substrate samples had only the first couple of milliliters of material collected, apparently by hammer and chisel.



Data Irregularity

- Example, composite sample of concrete building material in building 9-62. The composite sample result is 606 ppm PCB, which is higher than the paint sample result of 117 ppm. Bottom line, the data is suspect.
- Impact: These data are at the heart of an EPA/Army informal dispute that is over 2 years old, has been elevated to both party's headquarters, and is still not resolved.
- This conflict has made the site ineligible for millions of dollars in FRP funds
- FRP is OMA-funded compared to BRAC and MCA-funded demolition. FRP accounts for about 20% of what the Army does.
- If the problem hits FRP, what effects could it have on the other 80% of Army-funded, not to speak at all about Air Force, Navy, NASA, etc.?



PCB bulk waste product OR PCB remediation waste?

Building #	Composite Sample Result for PCBs (mg/kg or ppm)	Substrate Material	2008 Paint Result	2008 Substrate Result
5A-25	408 N	Concrete	7770	18
5A-26	143	Concrete	2670	76
5A-55	195.4 J	Plaster	4290	ND
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9-62	606 J	Concrete	117	ND
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9-64(Green o Red)	462.2 J	Concrete	7960	218

Samples Not Representative - The 2008 and 2009 concrete samples were not representative of the waste stream.



Impact:

- Site ineligible for millions of dollars in FRP funds
- Buildings remain at site



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PCB bulk waste product OR PCB remediation waste?

- EPA TSCA guidance states painted demolition debris is PCB bulk waste product and may be disposed of in a municipal solid waste
- EPA region 7 claims PCB remediation waste as PCB's from the paint may have migrated into the substrate constituting a "spill"
- Army does not agree that painting a building material constitutes a spill or release, nor does the physical processes of paint drying and settling into the pores of a structural material constitute a release.



ERDC Sampling Strategy



Through providing an accurate representation of the extent of PCB contamination on painted building materials, a scientifically valid characterization can be provided



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PCB in Paint and Substrate

The 2009 composite sampling report states that 1 inch in diameter by $\frac{1}{2}$ to $\frac{3}{4}$ inch deep core samples were collected.



2010
Representative
Sample



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2008 Results vs. 2010 Results (3 of 4 Buildings Below 50mg/kg action limit)

Building #	2008 Paint PCB Result (mg/kg)	2008 Substrate Result (mg/kg)	Substrate Material	Paint Color	2010 Paint Result (mg/kg)	2010 Substrate Result (mg.kg)
5A-21	795	210	plaster	Beige on Red on Green	240	0.35
5A-26	2670	76	concrete	Yellow	10,000	9.6
5B-137-2	1040	139	gypsum	Blue	210	260
5B-137-2	1100	52	chipboard	yellow	450	170
9-64	7960	218	concrete	Green	950	0.99



Project Summary



Where surface paint concentrations of 290 mg/kg were observed, only 2 mg/Kg was present in the plaster directly beneath the paint.

gradients in concentration with depth were not observed in the data

- **All 2010 substrate sampling results for plaster and concrete are less than 50 mg/kg**
- The 2010 results are orders of magnitude less than the 2008
- Bottom line, no indication of migration



Conclusions

- True sample cores were taken that revealed surface paint as the source of PCB contamination with negligible diffusion into underlying concrete, as declining gradients in concentration with depth were not observed in the data.
- Consequently the potential for migration into the underlying Substrate differs considerably from a scenario such as transformer oil spills onto a concrete slab.
- However samples from wood and other porous materials (e.g. gypsum, chipboard) indicated diffusion into the substrate.
- Such information has considerable regulatory and financial significance in assessing whether the site is classified as PCB bulk waste product or PCB remediation waste.



Questions?



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